

THURSDAY, FEBRUARY 1, 1900.

A YEAR OF BIOLOGY.

L'Année Biologique. Comptes rendus annuels des Travaux de Biologie générale, publiés sous la direction de Yves Delage, professeur à la Sorbonne, avec la collaboration d'un comité de rédacteurs, Secrétaire de la rédaction Georges Poirault, directeur du Laboratoire d'enseignement supérieur de la villa Thuret, à Antibes. Troisième année, 1897. Pp. xxxv + 842. (Paris: Librairie C. Reinwald, Schleicher Frères, éditeurs. 1899.)

THIS biological annual has improved with each year of its life, and its third volume, which deals with the literature for 1897, commands our admiration and gratitude. There is no denying that the bibliographic lists are fairly full, and that the summaries give the gist of the books and papers reported. It fills what was otherwise more or less of a gap in our bibliographic resources, and every biological laboratory throughout the world should make it a point of honour to have the volumes upon the shelves for reference. Furthermore, the work is being so well done that all those who are busy over the general problems of biology should see to it, in their own interest, as well as in that of science, that copies and abstracts of their papers are sent to the editors.

Believing that criticism is the sincerest form of flattery, we would use this opportunity to make a few suggestions. The "Annual" has not only improved every year, but it has grown steadily bigger, and it is now a most inconveniently heavy handful. Can it not be kept within more moderate compass? On this point we have three criticisms: (1) That over 160 pages are given to mental functions, which seems going a long way, seeing that we have *L'Année psychologique* as well; (2) that some of the reports are outrageously long, especially when the conclusion hinted at is that the paper is not worth very much after all; and (3) that the classification adopted favours overlapping and repetition. The last point seems to us so important that we venture to enlarge upon it.

As they stand at present the chapters are:—the cell; sex-elements and fertilisation; parthenogenesis; asexual reproduction; ontogeny; teratogeny; regeneration; grafting; sex, secondary sex-characters, and "ergatogenic polymorphism"; metagenetic polymorphism, metamorphosis, and alternation of generations; latent characters; correlation; death, immortality, and the germ-plasm; general morphology and physiology; heredity; variation; origin of species; geographical distribution; nervous system and mental functions; general theories and generalities. Now, as each of these twenty chapters has its bibliography and introduction and summaries, there is bound to be needless printing and overlapping. Can the committee not invent something simpler and more logical? It is too soon to stereotype the arrangement.

Teratogeny and variation overlap; variation and the origin of species overlap; ontogeny and general physiology overlap; latent characters and heredity overlap; and so on. In short, there is a great lack of lucidity in the classification adopted.

Would it not be better to have a more general scheme? e.g. (1) morphological analysis:—cell-structure, tissue-structure, &c.; (2) physiological analysis:—cell-function, growth, correlation, death, &c.; (3) reproduction and sex—including chapters 2, 3, 4, 9, and perhaps others; and so on. There is room for much difference of opinion, but twenty chapters are twice too many.

It may be answered that the numerous divisions facilitate reference, but the separately designated subjects would not be less accessible if they were sub-divisions of larger categories. We would press this point on the consideration of the editorial committee the more urgently, since it seems to us that the elaborate classification has sometimes proved a snare. Thus we should like to know why papers by Karl Pearson and others dealing with "spurious correlation," &c., are included in the chapter on physiological correlation. Is not this a misapprehension?

In the same connection we may refer to the editorial note on polymorphism, which we regret our inability to appreciate. Three kinds of polymorphism are distinguished (which are treated of in three different chapters)—(a) ergatogenic polymorphism which depends upon division of labour (which should include not only the polymorphic adaptations of an ant-hill, but functional "modifications" as well); (b) metagenic polymorphism, associated with alternation of generations; and (c) œcogenic polymorphism which results from the action of the environment (a particular case, surely, of environmental "modification"). But why not also add variational polymorphism, which would be a *reductio ad absurdum* of the extended usage of the term?

Many of the chapters present some striking feature of interest, giving a charm of individuality to the workmanship. Thus the chapter on the cell includes an account by A. Labbé of the artificial cells which Ascherson made in the memorable year 1838. With his artificial emulsions he was a pioneer on a path which Bütschli and others have followed up, "and if he sought for homologies where there were but analogies, some moderns are open to the same reproach." The second chapter contains an essay of twenty pages by L. Guignard on chromatic reduction, which is very welcome; but the bulk of it has been printed elsewhere, and it seems far too long to be consistent with the precise scope of this annual. We are ungrateful enough to object also to Pruvot's fine essay on fresh-water faunas as too long and independent for the present publication. The thirteenth chapter is made conspicuous by the essay of Elie Metchnikov on senile degeneration, showing up the organism's seamy side—its imperfect integration, its anarchy, its struggle of parts—of which senility is the *débâcle*. Needless to say, the essay is original and charming; but to our thinking, it should have been published in the *Revue des deux Mondes*, and not here. It is magnificent, but it is not a "compte-rendu." We fear, indeed, lest these introductory essays, if not kept more sternly within bounds, will harm the annual instead of helping it.

As for criticisms of technique, they are not much to our liking, especially since the volume represents a portentous amount of disinterested labour, the results of which are of great value to all biological workers. There

has been great improvement, but it must be confessed that there is still need of increased carefulness. Thus, if we take (quite at random) p. 792, we have a paper by Bütschli stated to extend from p. 291 to p. 593 of the *Arch. Entwicklmech.*, which is incredible; Haacke's text-book called a Grundriss; Hertwig's "Streitfragen" wrongly spelt; Hickson's paper on the medusæ of Millepora cited where it seems irrelevant—trivial mistakes all of them, but too many for one page, and it is so elsewhere. All the same, this third volume of "L'Année Biologique" is a fine piece of work, and every biologist will wish it the success it deserves. J. A. T.

AN ARITHMETICAL MISCELLANY.

Exercices d'Arithmétique. Par J. Fitz-Patrick et G. Chevrel. Deuxième édition. Pp. xiv + 680. (Paris: A. Hermann, 1900.)

THIS second edition of a very entertaining book differs from the first by the inclusion of more than 500 new and unsolved examples, and a supplement on commercial arithmetic, which, no doubt, will be found very useful by the French schoolmaster, but is so incongruous with the rest of the work as to recall Horace's well-known parable of the mermaid and its analogues in literature and art.

Apart from this concession to the practical, the authors, largely imbued with the spirit of Edouard Lucas, have provided their readers with a varied store of illustrations of Diophantine arithmetic and of numerous fundamental propositions in the theory of numbers. Their solutions are very clear and simple (though they might, with advantage, have made more use of the notation of congruences), and they will undoubtedly succeed in promoting a more general and intelligent interest in the theory of arithmetic.

Many of the examples are of a very elementary character; but there are some which deserve the attention of expert mathematicians. For instance (p. 366), we have Lucas's determination of *all* the prime factors of $(a^{120} - b^{120}) (a - b)$, where a, b are the roots of $x^2 = x - 2$; the last five of these primes being

125541359, 25215201901, 34449677641, 153790567559,
733268745721.

This result is said to have been verified by M. Le Lasseur. Again (p. 158), the Rev. Father J. Pervouchine, of Perm, has found that $2^{223} + 1$, comprising 2525223 digits, is divisible by 167772161 ($= 5 \cdot 2^{25} + 1$), which is prime. Here are mysteries which we must leave to Lieut.-Colonel Cunningham and Mr. Bickmore to unravel.

An agreeable element of humour is supplied by Question 399, on the interpretation of Art. 757 of the Civil Code; that ambiguous drafting is not wholly unknown on the other side of the Channel is a surprise which is not without its consolations.

It would be tedious to detail even the more conspicuous features of this handsome volume; enough to say that every student of arithmetic will find in it something to arouse his interest and extend his knowledge. If he is a novice, the study of this book will help him to appreciate the works of at least the earlier masters, such

as Euler and Lagrange; if he is a veteran, he will find recreation in turning over its pages in his leisure moments.

There is one reflection which a perusal of the work can hardly fail to suggest. The province of arithmetic is so definite that one would expect its methods to be marked by a general uniformity. But this is far from being the case; and there is, in particular, an unmistakable contrast between Diophantine arithmetic and the severe, but noble science founded by Lagrange, Gauss and Kummer, which we may distinguish as the analytical theory of numbers. Their points of contact in such things as the elementary theory of congruences and of residues only serve, at present, to accentuate their divergences; it may almost be affirmed that they appeal to different classes of mind. To use a metaphor, we may say that one is the primitive gold-mining of the individual prospector, the other the systematic working of a quartz reef with the help of modern machinery. Just now the analytical method holds the field; there are several reasons for this—the development of the theory of algebraic integers, the influence of function-theory, the general "arithmeticalising" of analysis; but a reaction is almost certain to come. It must be remembered that all the available evidence seems to show that Fermat's methods were essentially Diophantine; and there is very good reason to believe that he was in possession of some peculiar analysis, the secret of which died with him and still awaits rediscovery. Whether this is so or not, there can be no doubt that the cultivation of Diophantine methods deserves more attention than it receives. The risk of failure is great; but the chance of finding a treasure island exists, and ought to appeal to that spirit of adventure which dwells in every mathematician who is worthy of the name. G. B. M.

MISSIONARY ANTHROPOLOGY.

In Dwarf Land and Cannibal Country. A Record of Travel and Discovery in Central Africa. By A. B. Lloyd. With an introduction by the President of the Church Missionary Society. Pp. xxiv + 385. (London: T. Fisher Unwin, 1899.)

FURTHER information regarding the dwarfs of the north-eastern part of the Congo Basin is one of the main desiderata in African anthropology. We therefore turned to this volume hoping, from its title and size, for detailed measurements of these dwarfs, convincing evidence as to whether they belong to several tribes or are all clans of one tribe, and for further light on their beliefs and folklore. But we are disappointed, for the book adds practically nothing to our knowledge of this group of dwarfs, and the title is misleading. The book narrates the story of Mr. Lloyd's missionary labours and adventures from July 14, 1894, to the end of 1898; most of these three and a half years were spent in the Uganda Protectorate, and the author's acquaintance with the Congo dwarfs was obtained between October 6 and 15, 1898. The account of his experiences with this people occur only within some seventeen pages, whereas 368 are devoted to "Out of Dwarf Land."

The bulk of the book is occupied with an account of